CLAIMS

1. An audio user-interfacing method in which items are represented in an audio field by corresponding synthesized sound sources from where sounds related to the items appear to emanate, the method including the steps of:

(a) providing an audio cursor in the form of a synthesised sound source that is movable in the audio field under user control and from which a distinctive cursor sound emanates; and

(b) comparing the current position of the audio cursor in the audio field with the positions of the item-representing sound sources and upon the cursor coming close to an item-representing sound source, generating a related audible indication by modifying the sounds emanating from at least one of that item-representing sound source and the cursor.

2. A method according to claim 1, wherein said audible indication is varied in correspondence with changes in the distance between said item-representing sound source and the cursor whereby to facilitate an appreciation by the user as to whether user-commanded cursor movement is moving the cursor closer to or further from the item-representing sound source.

3. A method according to claim 2, wherein said audible indication is varied by changing a continuously-variable audio characteristic in correspondence with changes in the distance between said item-representing sound source and the cursor.

4. A method according to claim 2, wherein said audible indication is varied by changing a spoken element to indicate the distance between said item-representing sound source and the cursor.

5. A method according to claim 1, wherein said audible indication is indicative of the direction of the said item-representing sound source from the cursor or the reverse of this direction.

6. A method according to claim 5, wherein said audible indication is varied by changing a continuously-variable audio characteristic to indicate the direction of the said item-representing sound source from the cursor or the reverse.

7. A method according to claim 5, wherein said audible indication is varied by changing a spoken element to indicate the direction of the said item-representing sound source from the cursor or the reverse.

8. A method according to claim 1, wherein said audible indication is varied in correspondence with changes in the distance between said item-representing sound source and the cursor whereby to facilitate an appreciation by the user as to whether user-commanded cursor movement is moving the cursor closer to or further from the item-representing sound source; said audible indication also being such as to indicate the direction of the said item-representing sound source from the cursor or the reverse of this direction.

9. A method according to claim 1, wherein said audible indication is provided solely through modifying the sounds emanating from the item-representing sound source.

10. A method according to claim 1, wherein said audible indication is provided solely through modifying the sounds emanating from the cursor.

11. A method according to claim 8, wherein the audible indication comprises a first component provided through modifying the sounds emanating from the item-representing sound source, and a second component provided through modifying the sounds emanating from the cursor; one said component being varied in correspondence with changes in the distance between the item-representing sound source and the cursor, and the other said component being indicative of the direction of the said item-representing sound source from the cursor or the reverse of this direction.

12. A method according to claim 1, wherein the said audible indication is used to signal to the user when the said item-representing sound source and cursor are coincident, at least in terms of their direction from a user reference location.

13. A method according to claim 1, wherein the audible indication comprises at least a first, non-varying, element indicative of the general proximity of the cursor to a said item-representing sound source, and a second, continuously variable, element indicating the separation distance between the cursor and the item-representing sound source.

14. A method according to claim 1, wherein the audio cursor is moved in the audio field by directly changing, through user input, the rendering position of the cursor in the audio field.

15. A method according to claim 1, wherein the item-representing sound sources are arranged in one or groups with the or each group being associated with a respective audio-field reference relative to which the sound sources of the group are positioned, the cursor sound source being associated with a further audio-field reference; the audio-field references being independently movable relative to a presentation reference determined by a mounting configuration of audio output devices used to synthesise said sound sources; movement of the cursor in the audio field being effected by user-controlled movement of the cursor-associated audio-field reference relative to the presentation reference.

16. A method according to claim 15, wherein the cursor-associated audio field reference is stabilised relative to one of:

- a user's body;
- a user's head;

this stabilisation taking account of whether audio output devices used to synthesise the sound sources are world, body or head mounted, and, as appropriate, rotation of the user's head or body.

17. A method according to claim 1, wherein the cursor is movable in a depth direction of the audio field towards and away from a user reference position, the said distinctive cursor

sound being varied to provide the user with an indication of the current position of the cursor in said depth direction.

18. A method according to claim 1, wherein in step (b) the cursor is determined to be close to an item-representing sound source when it is within a threshold distance of the latter, this threshold distance being settable by the user.

19. A method according to claim 1, including the further step of selecting an item by aligning the audio cursor with the corresponding item-representing sound source and providing a selection command input.

20. A method according to claim 19, wherein at least some of the said items represented by the sound sources are audio labels for services, the method further involving selecting a service by selecting the corresponding audio-label item using the audio cursor.

21. Apparatus for providing an audio user interface in which items are represented in an audio field by corresponding synthesized sound sources from where sounds related to the items appear to emanate, the apparatus comprising:

- rendering-position determining means for determining, for each item-representing sound source, an associated rendering position at which the sound source is to be synthesized to sound in the audio field;
- cursor-control means for determining, under user control, a current rendering position in the audio field of a cursor sound source and for providing a distinctive cursor sound for output from the cursor sound source;
- rendering means, including audio output devices, for generating an audio field in which said item-representing and cursor sound sources are synthesized at their associated rendering positions; and
- cursor-proximity means for comparing the current rendering position of the audio cursor with the rendering positions of the item-representing sound sources and upon the cursor being determined as close to an item-representing sound source, for generating a related audible indication by modifying the sounds emanating from at least one of that item-representing sound source and the cursor sound source.

22. Apparatus according to claim 21, wherein said cursor-proximity means is operative to vary said audible indication in correspondence with changes in the distance between said item-representing sound source and the cursor whereby to facilitate an appreciation by the user as to whether user-commanded cursor movement is moving the cursor closer to or further from the item-representing sound source.

23. Apparatus according to claim 21, wherein said cursor-proximity means is operative to control said audible indication to indicate the direction of the said item-representing sound source from the cursor or the reverse of this direction.

24. Apparatus according to claim 21, wherein said cursor-proximity means is operative to vary said audible indication in correspondence with changes in the distance between said item-representing sound source and the cursor, the cursor-proximity means being further operative to control said audible indication to indicate the direction of the said item-representing sound source from the cursor or the reverse of this direction.

25. Apparatus according to claim 21, wherein said cursor-proximity means is operative to provide said audible indication solely through modifying the sounds emanating from the item-representing sound source.

26. Apparatus according to claim 21, wherein said cursor-proximity means is operative to provide said audible indication solely through modifying the sounds emanating from the cursor sound source.

27. Apparatus according to claim 24, wherein said cursor-proximity means is operative to provide said audible indication in the form of a first component provided through modifying the sounds emanating from the item-representing sound source, and a second component provided through modifying the sounds emanating from the cursor sound source; said cursor-proximity means varying one said component in correspondence with changes in the distance between the item-representing sound source and the cursor, and

controlling the other said component to be indicative of the direction of the said item-representing sound source from the cursor or the reverse of this direction.

28. Apparatus according to claim 21, wherein said cursor-proximity means is operative to control the said audible indication to signal to the user when the said item-representing sound source and cursor are coincident, at least in terms of their direction from a user reference location.

29. Apparatus according to claim 21, wherein said cursor-proximity means is operative to form the said audible indication with at least a first, non-varying, element indicative of the general proximity of the cursor to a said item-representing sound source, and a second, continuously variable, element indicating the separation distance between the cursor and the item-representing sound source.

30. Apparatus according to claim 21, wherein the cursor-control means includes user-operable input means arranged to directly change the rendering position of the cursor sound source in the audio field.

31. Apparatus according to claim 21, wherein the cursor-control means comprises:

- means for setting the location of the cursor sound source relative to an audio-field reference;
- user input means for controlling an offset between the audio-field reference and a presentation reference, the presentation reference being determined by a mounting configuration of the audio output devices; and
- means for deriving the rendering position of each sound source based on the location of the sound source in the audio field and said offset.

32. Apparatus according to claim 31, wherein the cursor-control means further comprises stabilisation means for varying the said offset in dependence rotation of the user's head or body and taking account .of whether said audio output devices are world, body or head mounted, such as to stabilise said audio field reference relative to one of:

- a user's body;

- a user's head.

33. Apparatus according to claim 21, wherein the cursor-control means is operative to enable the cursor to be moved under user control in a depth direction of the audio field towards and away from a user reference position, the cursor-control means being further operative to vary said distinctive cursor sound to provide the user with an indication of the current position of the cursor in said depth direction.

34. Apparatus according to claim 21, wherein the cursor-proximity means is operative to determine the cursor as being close to an item-representing sound source when it is within a threshold distance of the latter, the apparatus including user-operable means for setting this threshold distance.

35. Apparatus according to claim 21, further comprising selection means for selecting an item by providing a selection command input after the audio cursor has been aligned with the corresponding item-representing sound source using the cursor-control means.

36. Apparatus according to claim 35, wherein at least some of the said items represented by the sound sources are audio labels for services.

37. Apparatus for providing an audio user interface in which items are represented in an audio field by corresponding synthesized sound sources from where sounds related to the items appear to emanate, the apparatus comprising:

- a rendering-position determining arrangement operative to determine, for each item-representing sound source, an associated rendering position at which the sound source is to be synthesized to sound in the audio field;
- a cursor-control arrangement operative to determine, under user control, a current rendering position in the audio field of a cursor sound source and to provide a distinctive cursor sound for output from the cursor sound source;
- a rendering subsystem, including audio output devices, arranged to generate an audio field in which said item-representing and cursor sound sources are synthesized at their associated rendering positions; and

- a cursor-proximity arrangement operative to compare the current rendering position of the audio cursor with the rendering positions of the item-representing sound sources and, upon the cursor being determined as close to an item-representing sound source, to generate a related audible indication by modifying the sounds emanating from at least one of that item-representing sound source and the cursor sound source.

38. Apparatus according to claim 37, wherein said cursor-proximity arrangement is operative to vary said audible indication in correspondence with changes in the distance between said item-representing sound source and the cursor whereby to facilitate an appreciation by the user as to whether user-commanded cursor movement is moving the cursor closer to or further from the item-representing sound source.

39. Apparatus according to claim 37, wherein said cursor-proximity arrangement is operative to control said audible indication to indicate the direction of the said item-representing sound source from the cursor or the reverse of this direction.

40. Apparatus according to claim 37, wherein said cursor-proximity arrangement is operative to vary said audible indication in correspondence with changes in the distance between said item-representing sound source and the cursor, the cursor-proximity arrangement being further operative to control said audible indication to indicate the direction of the said item-representing sound source from the cursor or the reverse of this direction.

41. Apparatus according to claim 37, wherein said cursor-proximity arrangement is operative to provide said audible indication solely through modifying the sounds emanating from the item-representing sound source.

42. Apparatus according to claim 37, wherein said cursor-proximity arrangement is operative to provide said audible indication solely through modifying the sounds emanating from the cursor sound source.

43. Apparatus according to claim 40, wherein said cursor-proximity arrangement is operative to provide said audible indication in the form of a first component provided through modifying the sounds emanating from the item-representing sound source, and a second component provided through modifying the sounds emanating from the cursor sound source; said cursor-proximity arrangement varying one said component in correspondence with changes in the distance between the item-representing sound source and the cursor, and controlling the other said component to be indicative of the direction of the said item-representing sound source from the cursor or the reverse of this direction.

44. Apparatus according to claim 37, wherein said cursor-proximity arrangement is operative to control the said audible indication to signal to the user when the said item-representing sound source and cursor are coincident, at least in terms of their direction from a user reference location.

45. Apparatus according to claim 37, wherein said cursor-proximity arrangement is operative to form the said audible indication with at least a first, non-varying, element indicative of the general proximity of the cursor to a said item-representing sound source, and a second, continuously variable, element indicating the separation distance between the cursor and the item-representing sound source.

46. Apparatus according to claim 37, wherein the cursor-control arrangement includes user-operable input device arranged to directly change the rendering position of the cursor sound source in the audio field.